

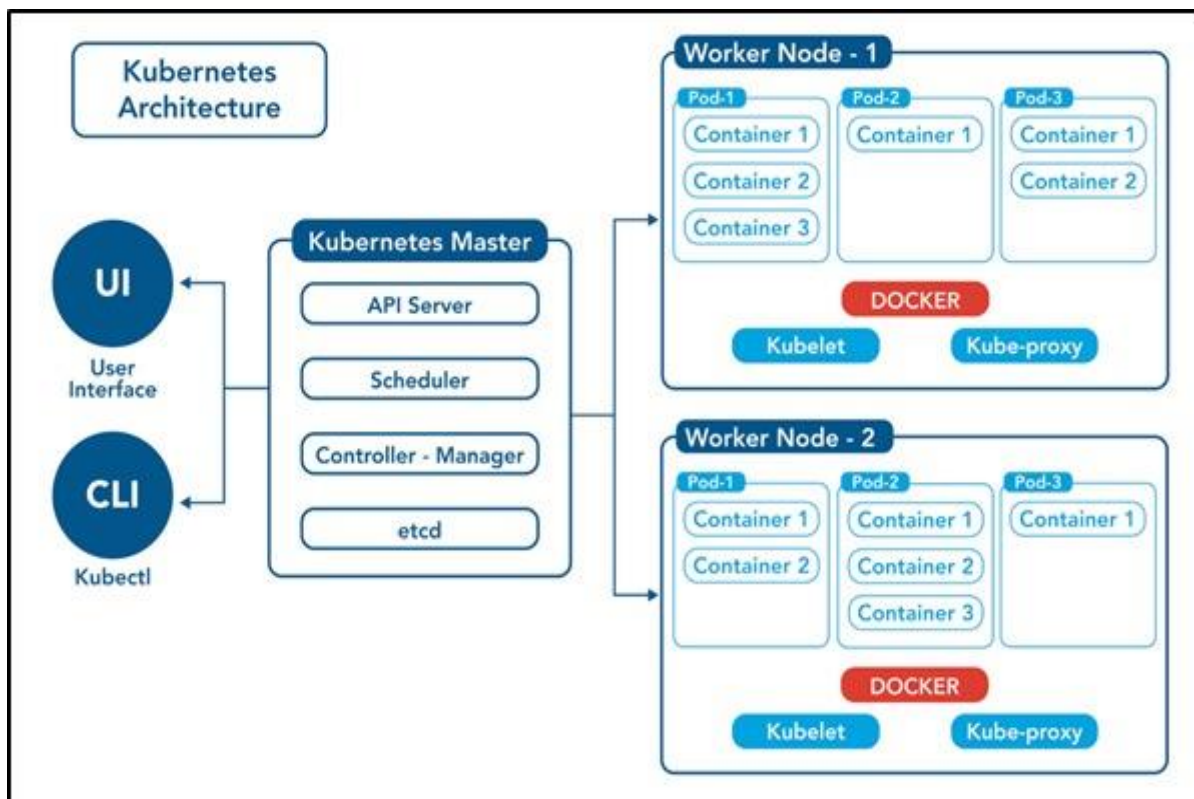
## KUBERNETES

- Kubernetes is an open source container orchestration engine for automating deployment, scaling, and management of containerized applications. The open source project is hosted by the Cloud Native Computing Foundation (CNCF).
- It provides a scalable and resilient framework for automating the deployment, scaling, and management of applications across clusters of servers.

### A SMALL HISTORY OF K8S:

- In the early 2000s, Google started developing a system called Borg to manage their internal containerized applications.
- Borg enabled Google to run applications at scale, providing features such as automatic scaling, service discovery, and fault tolerance.
- In 2014, Google open-sourced a version of Borg called Kubernetes.
- Kubernetes was donated to the Cloud Native Computing Foundation (CNCF), a neutral home for open-source cloud-native projects, in July 2015.
- Kubernetes 1.8 added significant enhancements for storage, security, and networking. Key features included the stable release of the stateful sets API, expanded support for volume plugins, and improvements in security policies.

### KUBERNETES ARCHITECTURE



## **Control Plane /Master Node:**

- The control plane's components make global decisions about the cluster (for example, scheduling), as well as detecting and responding to cluster events (for example, starting up a new pod when a deployment's replicas field is unsatisfied).
- Control plane components can be run on any machine in the cluster. Do not run user containers on this machine.

## **Node Components / Worker Nodes**

Node components run on every node, maintaining running pods and providing the Kubernetes runtime environment.

- Master Node: The master node is responsible for managing the cluster and coordinating the overall state of the system. It includes the following components:
- API Server: The API server is the central control point for all interactions with the cluster. It exposes the Kubernetes API and handles requests from users and other components.
- Scheduler: The scheduler is responsible for assigning workloads (pods) to individual worker nodes based on resource requirements, constraints, and other policies.
- Controller Manager: The controller manager runs various controllers that monitor the cluster state and drive it towards the desired state. Examples include the replication controller, node controller, and service controller.
- etcd: etcd is a distributed key-value store used by Kubernetes to store cluster state and configuration data.

## **POD**

The basic building block of Kubernetes. A pod represents a single instance of a running process within the cluster. It can encapsulate one or more containers that share the same network and storage resources.

## **COMMANDS**

### **1. Create a pod using run command**

```
$ kubectl run <pod-name> --image=<image-name> --port=<container-port>
```

```
$ kubectl run my-pod --image=nginx --port=80
```

### **2. View all the pods**

(In default namespace)

```
$ kubectl get pods
```

(In All namespace)

\$ kubectl get pods -A

# For a specific namespace

\$ kubectl get pods -n kube-system

# For a specific type

\$ kubectl get pods <pod-name>

\$ kubectl get pods <pod-name> -o wide

\$ kubectl get pods <pod-name> -o yaml

\$ kubectl get pods <pod-name> -o json

### 3. Describe a pod (View Pod details)

\$ kubectl describe pod <pod-name>

\$ kubectl describe pod my-pod

### 4. View Logs of a pod

\$ kubectl logs <pod-name>

\$ kubectl logs my-pod

```
akshitha@ITP-CC16-19:~$ minikube version
minikube version: v1.35.0
commit: dd5d320e41b5451cdf3c01891bc4e13d189586ed-dirty
akshitha@ITP-CC16-19:~$ minikube start
👉 minikube v1.35.0 on Ubuntu 24.04 (amd64)
🔧 Using the docker driver based on existing profile
👉 Starting "minikube" primary control-plane node in "minikube" cluster
👉 Pulling base image v0.0.46 ...
👉 Restarting existing docker container for "minikube" ...
👉 Preparing Kubernetes v1.32.0 on Docker 27.4.1 ...
🔍 Verifying Kubernetes components...
   ▪ Using image gcr.io/k8s-minikube/storage-provisioner:v5
   ▪ Enabled addons: storage-provisioner, default-storageclass
👉 Done! kubectrl is now configured to use "minikube" cluster and "default" namespace by default
akshitha@ITP-CC16-19:~$ kubectl run my-pod --image=nginx --port=80
pod/my-pod created
akshitha@ITP-CC16-19:~$ kubectl get pod
NAME      READY   STATUS    RESTARTS   AGE
my-pod    0/1     ImagePullBackOff    0          75s
akshitha@ITP-CC16-19:~$ kubectl get node
NAME      STATUS   ROLES    AGE   VERSION
minikube  Ready    control-plane   21h   v1.32.0
akshitha@ITP-CC16-19:~$ kubectl delete all --all
pod "my-pod" deleted
service "kubernetes" deleted
akshitha@ITP-CC16-19:~$ kubectl run my-pod --image=nginx --port=80
pod/my-pod created
akshitha@ITP-CC16-19:~$ kubectl get node
NAME      STATUS   ROLES    AGE   VERSION
minikube  Ready    control-plane   22h   v1.32.0
akshitha@ITP-CC16-19:~$ kubectl get pod
NAME      READY   STATUS    RESTARTS   AGE
my-pod    0/1     ContainerCreating    0          9s
akshitha@ITP-CC16-19:~$ kubectl get pod -o wide
NAME      READY   STATUS    RESTARTS   AGE   IP            NODE      NOMINATED NODE   READINESS GATES
my-pod    1/1     Running   0           55s   10.244.0.5    minikube   <none>            <none>
akshitha@ITP-CC16-19:~$ sudo nano pod.yml
[sudo] password for akshitha:
akshitha@ITP-CC16-19:~$ kubectl get pod
NAME      READY   STATUS    RESTARTS   AGE
my-pod    1/1     Running   0           54m
akshitha@ITP-CC16-19:~$ sudo nano pod.yml
akshitha@ITP-CC16-19:~$ kubectl get pod
NAME      READY   STATUS    RESTARTS   AGE
my-pod    1/1     Running   0           55m
akshitha@ITP-CC16-19:~$ sudo nano pod.yml
akshitha@ITP-CC16-19:~$ kubectl delete all --all
pod "my-pod" deleted
service "kubernetes" deleted
akshitha@ITP-CC16-19:~$ sudo nano pod.yml
akshitha@ITP-CC16-19:~$ kubectl get pod
```

```
akshitha@ITP-CC16-19: ~  
NAME      READY   STATUS    RESTARTS   AGE  
my-pod    1/1     Running   0           54m  
akshitha@ITP-CC16-19:~$ sudo nano pod.yml  
akshitha@ITP-CC16-19:~$ kubectl get pod  
NAME      READY   STATUS    RESTARTS   AGE  
my-pod    1/1     Running   0           55m  
akshitha@ITP-CC16-19:~$ sudo nano pod.yml  
akshitha@ITP-CC16-19:~$ kubectl delete all --all  
pod "my-pod" deleted  
service "kubernetes" deleted  
akshitha@ITP-CC16-19:~$ sudo nano pod.yml  
akshitha@ITP-CC16-19:~$ kubectl get pod  
No resources found in default namespace.  
akshitha@ITP-CC16-19:~$ kubectl get pod  
No resources found in default namespace.  
akshitha@ITP-CC16-19:~$  
akshitha@ITP-CC16-19:~$ kubectl get pod  
No resources found in default namespace.  
akshitha@ITP-CC16-19:~$ kubectl get pod  
No resources found in default namespace.  
akshitha@ITP-CC16-19:~$ kubectl get pod  
No resources found in default namespace.  
akshitha@ITP-CC16-19:~$ sudo nano pod.yml  
akshitha@ITP-CC16-19:~$ kubectl apply -f pod.yml  
pod/my-app created  
akshitha@ITP-CC16-19:~$ kubectl get pod  
NAME      READY   STATUS    RESTARTS   AGE  
my-app    0/1     ContainerCreating   0           8s  
akshitha@ITP-CC16-19:~$ sudo nano pod.yml  
akshitha@ITP-CC16-19:~$ kubectl get pod  
NAME      READY   STATUS    RESTARTS   AGE  
my-app    1/1     Running    0          3m34s  
akshitha@ITP-CC16-19:~$
```

## 5. Execute any command inside Pod (Inside Pod OS)

\$ kubectl exec <pod-name> -- <command>

### pod.yml

apiVersion: v1

kind: Pod

metadata:

name: my-app

spec:

containers:

- name: my-app-container

image: <images> ports:

- containerPort: 9090

## Create ReplicaSet by executing by YAML file

### replicaset.yml

kind: ReplicaSet

metadata:

name: my-rs

labels:

name: my-rs

spec:

replicas: 4

selector:

matchLabels:

apptype: web-backend

template:

metadata:

labels:

apptype: web-backend

spec:

containers:

- name: my-app

image:

ports:

- containerPort: 8080

```
$ kubectl create -f rs-test.yml
```

# Do necessary modifications if exist, else create new

```
$ kubectl apply -f rs-test.yml
```

# Completely Modify Pod Template

```
$ kubectl replace -f rs-test.yml
```

## **View ReplicaSets**

```
$ kubectl get replicaset
```

```
$ kubectl get rs
```

```
$ kubectl get rs -o wide
```

```
$ kubectl get rs <replica-set-name> -o json
```

```
$ kubectl get rs <replica-set-name> -o yaml
```

## **View ReplicaSet Description**

```
$ kubectl describe rs <replica-set-name>
```

## **We can modify generated/updated YAML file**

```
$ kubectl edit rs <replica-set-name>
```

```
## change replicas: count to any other value then (ESC):wq
```

```
# We can modify our YAML file and then execute apply command
```

```
$ kubectl apply -f rs-test.yml
```

```
## We can Even scale using command also
```

```
$ kubectl scale replicaset <replicaset-name> --replicas=<desired-replica-count>
```

## **Delete ReplicaSet**

```
$ kubectl delete rs <replica-set-name>
```

```
$ kubectl delete -f rs-test.yml
```

## **Create deployment by executing by YAML file**

```
apiVersion: apps/v1
```

```
kind: Deployment
```

```
metadata:
```

```
  name: my-deploy
```

```
  labels:
```

```
    name: my-deploy
```

spec:

replicas: 4

selector:

matchLabels:

apptype: web-backend

strategy:

type: RollingUpdate

template:

metadata:

labels:

apptype: web-backend

spec:

containers:

- name: my-app

image:

ports:

- containerPort: 7070

kubectl create deployment webnginx2 --image=nginx:latest --replicas=1

kubectl scale deploy <deployment-name> --replicas=<desired-replica-count>

```
akshitha@ITP-CC16-19: ~$ kubectl get pods
NAME                                READY    STATUS    RESTARTS   AGE
my-app                              1/1      Running   1 (3m16s ago)    151m
my-pod                              1/1      Running   1 (3m16s ago)    140m
my-rs-9zd7s                         1/1      Running   1 (3m16s ago)    117m
my-rs-fmswv                         1/1      Running   1 (3m16s ago)    117m
my-rs-j68s7                         1/1      Running   1 (3m16s ago)    117m
my-rs-jmkst                         1/1      Running   1 (3m16s ago)    117m
akshitha@ITP-CC16-19: ~$ kubectl get pods
NAME                                READY    STATUS    RESTARTS   AGE
my-app                              1/1      Running   1 (4m23s ago)    152m
my-pod                              1/1      Running   1 (4m23s ago)    141m
my-rs-9zd7s                         1/1      Running   1 (4m23s ago)    118m
my-rs-fmswv                         1/1      Running   1 (4m23s ago)    118m
my-rs-j68s7                         1/1      Running   1 (4m23s ago)    118m
my-rs-jmkst                         1/1      Running   1 (4m23s ago)    118m
akshitha@ITP-CC16-19: ~$ kubectl get rs
NAME                                DESIRED  CURRENT  READY  AGE
my-rs                                4         4        4      122m
akshitha@ITP-CC16-19: ~$ sudo nano replicaset.yml
[sudo] password for akshitha:
root@my-rs-9zd7s:/usr/local/tomcat# kubectl exec -it my-rs-9zd7s -- /bin/bash
root@my-rs-9zd7s:/usr/local/tomcat# exit
exit
akshitha@ITP-CC16-19: ~$ ls
jenkinsfile.save  docker-compose.yml  pod.yml  replicaset.yml  simple-web-app
akshitha@ITP-CC16-19: ~$ ls
jenkinsfile.save  deployment.yml  docker-compose.yml  pod.yml  replicaset.yml  simple-web-app
akshitha@ITP-CC16-19: ~$ ls
jenkinsfile.save  deployment.yml  docker-compose.yml  pod.yml  replicaset.yml  simple-web-app
akshitha@ITP-CC16-19: ~$ kubectl create deployment webnginx2 --image=nginx:latest --replicas=1
deployment.apps/webnginx2 created
akshitha@ITP-CC16-19: ~$ kubectl scale deploy webnginx2 --replicas=2
error: no objects passed to scale deployments.apps "y-deploy" not found
akshitha@ITP-CC16-19: ~$ kubectl scale deployment webnginx2 --replicas=2
deployment.apps/webnginx2 scaled
akshitha@ITP-CC16-19: ~$
```

```
$ kubectl create -f web-deploy.yml
# Do necessary modifications if exist, else create new
$ kubectl create -f web-deploy.yml
# Completely Modify Pod Template
$ kubectl replace -f web-deploy.yml
```

### **View Deployments**

```
$ kubectl get deployments
$ kubectl get deploy
$ kubectl get deploy -o wide
$ kubectl get deploy <deployment-name> -o json
$ kubectl get deploy <deployment-name> -o yaml
```

### **View Deployment Description**

```
$ kubectl describe deploy <deployment-name>
```

### **We can modify generated/updated YAML file**

```
$ kubectl edit deploy <deployment-name>
## change replicas: count to any other value then (ESC):wq
# We can modify our YAML file and then execute apply command
$ kubectl apply -f web-deploy.yml
```

```
## We can Even scale using command also
```

```
$ kubectl scale deploy <deployment-name> --replicas=<desired-replica-count>
```

### **Delete Deployment**

```
$ kubectl delete deploy <deployment-name>
$ kubectl delete -f web-deploy.yml
```



## SERVICE

Service is an abstraction that defines a logical set of pods and a policy to access them. Services enable network connectivity and load balancing to the pods that are part of the service, allowing other components within or outside the cluster to interact with the application.

Service Types: Kubernetes supports different types of services:

1. NodePort: Exposes the service on a static port on each selected node's IP. This type makes the service accessible from outside the cluster by the <NodeIP>:<NodePort> combination.
2. ClusterIP: Exposes the service on a cluster-internal IP. This type makes the service only reachable within the cluster.
3. LoadBalancer: Creates an external load balancer in cloud environments, which routes traffic to the service.

### Create service by executing the yaml file

```
apiVersion: v1
```

```
kind: Service
```

```
metadata:
```

```
  name: my-service
```

```
  labels:
```

```
    app: my-service
```

```
    type: backend-app
```

```
spec:
```

```
  type: NodePort
```

```
  ports:
```

```
    - targetPort: 7070
```

```
      port: 7070
```

```
      nodePort: 30002
```

```
  selector:
```

```
    apptype: web-backend
```

```
akshitha@ITP-CC16-19: ~  
NAME                READY    STATUS    RESTARTS   AGE  
my-app              1/1      Running   1 (133m ago) 4h41m  
my-pod              1/1      Running   1 (133m ago) 4h30m  
my-rs-9zd7s         1/1      Running   1 (133m ago) 4h7m  
my-rs-fassw         1/1      Running   1 (133m ago) 4h7m  
my-rs-j68s7         1/1      Running   1 (133m ago) 4h7m  
my-rs-jkfst         1/1      Running   1 (133m ago) 4h7m  
webnginx2-85b94f8d56-jldpk 1/1      Running   0          75m  
webnginx2-85b94f8d56-jmmv  1/1      Running   0          77m  
akshitha@ITP-CC16-19:~$ kubectl describe service my-service  
Name: my-service  
Namespace: default  
Labels: app=my-service  
         type=backend-app  
Annotations: <none>  
Selector: apptype=web-backend  
Type: NodePort  
IP Family Policy: SingleStack  
IP Families: IPv4  
IP: 10.108.133.125  
IPs: 10.108.133.125  
Port: <unset> 7070/TCP  
TargetPort: <unset> 30002/TCP  
NodePort: 30002/TCP  
Endpoints: 10.244.0.14:7070,10.244.0.17:7070,10.244.0.16:7070 + 1 more...  
Session Affinity: None  
External Traffic Policy: Cluster  
Internal Traffic Policy: Cluster  
Events: <none>  
akshitha@ITP-CC16-19:~$ minikube ip  
192.168.49.2  
akshitha@ITP-CC16-19:~$ curl http://minikube-ip:30002  
-bash: minikube-ip: No such file or directory  
akshitha@ITP-CC16-19:~$ curl https://minikube-ip:30002  
-bash: minikube-ip: No such file or directory  
akshitha@ITP-CC16-19:~$ curl http://192.168.49.2:30002  
curl: (7) Failed to connect to 192.168.49.2 port 30002 after 0 ms: Couldn't connect to server  
akshitha@ITP-CC16-19:~$ curl http://192.168.49.2:30002  
curl: (7) Failed to connect to 192.168.49.2 port 30002 after 0 ms: Couldn't connect to server  
akshitha@ITP-CC16-19:~$ kubectl get pods -o wide  
NAME                READY    STATUS    RESTARTS   AGE    IP             NODE             NOMINATED NODE    READINESS GATES  
my-app              1/1      Running   1 (136m ago) 4h45m  10.244.0.12    minikube         <none>             <none>  
my-pod              1/1      Running   1 (136m ago) 4h34m  10.244.0.13    minikube         <none>             <none>  
my-rs-9zd7s         1/1      Running   1 (136m ago) 4h11m  10.244.0.16    minikube         <none>             <none>  
my-rs-fassw         1/1      Running   1 (136m ago) 4h11m  10.244.0.18    minikube         <none>             <none>  
my-rs-j68s7         1/1      Running   1 (136m ago) 4h11m  10.244.0.14    minikube         <none>             <none>  
my-rs-jkfst         1/1      Running   1 (136m ago) 4h11m  10.244.0.17    minikube         <none>             <none>  
webnginx2-85b94f8d56-jldpk 1/1      Running   0          79m    10.244.0.20    minikube         <none>             <none>  
webnginx2-85b94f8d56-jmmv  1/1      Running   0          80m    10.244.0.19    minikube         <none>             <none>  
akshitha@ITP-CC16-19:~$ curl http://192.168.49.2:30002  
curl: (7) Failed to connect to 192.168.49.2 port 30002 after 0 ms: Couldn't connect to server
```

```
akshitha@ITP-CC16-19: ~  
| default | my-service | | http://127.0.0.1:40909 |  
|-----| |-----| |-----| |-----|  
# Opening service default/my-service in default browser...  
# http://127.0.0.1:40909  
| | Because you are using a Docker driver on linux, the terminal needs to be open to run it.  
^C@ Stopping tunnel for service my-service.  
akshitha@ITP-CC16-19:~$ curl http://192.168.49.2:30002  
curl: (7) Failed to connect to 192.168.49.2 port 30002 after 0 ms: Couldn't connect to server  
akshitha@ITP-CC16-19:~$ sudo nano deployment.yml  
akshitha@ITP-CC16-19:~$ curl http://192.168.49.2:30002  
curl: (7) Failed to connect to 192.168.49.2 port 30002 after 0 ms: Couldn't connect to server  
akshitha@ITP-CC16-19:~$ minikube service my-service  
|-----| |-----| |-----| |-----|  
| NAMESPACE | NAME | TARGET PORT | URL |  
|-----| |-----| |-----| |-----|  
| default | my-service | | http://192.168.49.2:30002 |  
|-----| |-----| |-----| |-----|  
# Starting tunnel for service my-service.  
| NAMESPACE | NAME | TARGET PORT | URL | | | |
|-----| |-----| |-----| |-----|  
| default | my-service | | http://127.0.0.1:39197 |  
|-----| |-----| |-----| |-----|  
# Opening service default/my-service in default browser...  
# http://127.0.0.1:39197  
| | Because you are using a Docker driver on linux, the terminal needs to be open to run it.  
^C@ Stopping tunnel for service my-service.  
akshitha@ITP-CC16-19:~$ curl http://192.168.49.2:30002  
curl: (7) Failed to connect to 192.168.49.2 port 30002 after 0 ms: Couldn't connect to server  
akshitha@ITP-CC16-19:~$ curl http://192.168.49.2:30002  
curl: (7) Failed to connect to 192.168.49.2 port 30002 after 0 ms: Couldn't connect to server  
akshitha@ITP-CC16-19:~$ kubectl get services  
NAME                TYPE        CLUSTER-IP    EXTERNAL-IP    PORT(S)          AGE  
kubernetes           ClusterIP   10.96.0.1     <none>          443/TCP          4h46m  
my-service           NodePort    10.108.133.125 <none>          7070:30002/TCP   5m6s  
akshitha@ITP-CC16-19:~$ kubectl get pods  
NAME                READY    STATUS    RESTARTS   AGE  
my-app              1/1      Running   1 (133m ago) 4h41m  
my-pod              1/1      Running   1 (133m ago) 4h30m  
my-rs-9zd7s         1/1      Running   1 (133m ago) 4h7m  
my-rs-fassw         1/1      Running   1 (133m ago) 4h7m  
my-rs-j68s7         1/1      Running   1 (133m ago) 4h7m  
my-rs-jkfst         1/1      Running   1 (133m ago) 4h7m  
webnginx2-85b94f8d56-jldpk 1/1      Running   0          75m  
webnginx2-85b94f8d56-jmmv  1/1      Running   0          77m  
akshitha@ITP-CC16-19:~$ kubectl describe service my-service  
Name: my-service  
Namespace: default  
Labels: app=my-service  
         type=backend-app  
Annotations: <none>
```

```
akshitha@ITP-CC16-19:~$ curl http://192.168.49.2:30002
curl: (7) Failed to connect to 192.168.49.2 port 30002 after 0 ms: Couldn't connect to server
akshitha@ITP-CC16-19:~$ curl http://192.168.49.2:30002
curl: (7) Failed to connect to 192.168.49.2 port 30002 after 0 ms: Couldn't connect to server
akshitha@ITP-CC16-19:~$ curl http://192.168.49.2:30002
curl: (7) Failed to connect to 192.168.49.2 port 30002 after 0 ms: Couldn't connect to server
akshitha@ITP-CC16-19:~$ curl http://192.168.49.2:30002
curl: (7) Failed to connect to 192.168.49.2 port 30002 after 0 ms: Couldn't connect to server
akshitha@ITP-CC16-19:~$ curl http://192.168.49.2:30002
curl: (7) Failed to connect to 192.168.49.2 port 30002 after 0 ms: Couldn't connect to server
akshitha@ITP-CC16-19:~$ curl http://192.168.49.2:30002
curl: (7) Failed to connect to 192.168.49.2 port 30002 after 0 ms: Couldn't connect to server
akshitha@ITP-CC16-19:~$ curl http://192.168.49.2:30002
curl: (7) Failed to connect to 192.168.49.2 port 30002 after 0 ms: Couldn't connect to server
Warning: resource deployments/webnginx2 is missing the kubectrl.kubernetes.io/last-applied-configuration annotation which is required by kubectrl apply. kubectrl apply should only be used on resources created declaratively by either kubectrl create --save-config or kubectrl apply. The missing annotation will be patched automatically.
service/my-service configured
The Deployment "webnginx2" is invalid: spec.selector: Invalid value: v1.LabelSelector(MatchLabels:map[string]string{"app":"webnginx2", "apptype":"web-backend"}, MatchExpressions:[v1.LabelSelectorRequirement(nil)]): field is immutable
akshitha@ITP-CC16-19:~$ kubectrl delete deployment webnginx2
deployment.apps "webnginx2" deleted
akshitha@ITP-CC16-19:~$ kubectrl apply -f deployment.yml
deployment.apps/webnginx2 created
service/my-service unchanged
akshitha@ITP-CC16-19:~$ curl http://192.168.49.2:30002
<doctype html><html lang="en"><head><title>HTTP Status 404 - Not Found</title><style type="text/css">body {font-family:Tahoma,Arial,sans-serif;} h1, h2, h3, b {color:white;background-color:#525D76;} h1 {font-size:22px;} h2 {font-size:16px;} h3 {font-size:14px;} p {font-size:12px;} a {color:black;} .line {height:1px;background-color:#525D76;border:none;}</style></head><body><h1>HTTP Status 404 - Not Found</h1><hr class="line" /><p><b>Type</b><b>Status Report</p><p><b>Description</b> The origin server did not find a current representation for the target resource or is not willing to disclose that one exists.</p></body></html>
akshitha@ITP-CC16-19:~$ curl http://192.168.49.2:30002
<doctype html><html lang="en"><head><title>HTTP Status 404 - Not Found</title><style type="text/css">body {font-family:Tahoma,Arial,sans-serif;} h1, h2, h3, b {color:white;background-color:#525D76;} h1 {font-size:22px;} h2 {font-size:16px;} h3 {font-size:14px;} p {font-size:12px;} a {color:black;} .line {height:1px;background-color:#525D76;border:none;}</style></head><body><h1>HTTP Status 404 - Not Found</h1><hr class="line" /><p><b>Type</b><b>Status Report</p><p><b>Description</b> The origin server did not find a current representation for the target resource or is not willing to disclose that one exists.</p></body></html>
akshitha@ITP-CC16-19:~$ curl http://192.168.49.2:30002/maven-web-app/
<html>
<body>
<h2>Hello World!</h2>
</body>
</html>
akshitha@ITP-CC16-19:~$
```

## NAMESPACE

Namespace is a virtual cluster or logical partition within a cluster that provides a way to organize and isolate resources. It allows multiple teams or projects to share the same physical cluster while maintaining resource separation and access control.

## COMMANDS

# To create a namespace:

\$ kubectrl create namespace <namespace-name>

\$ kubectrl create ns my-bank

# To switch to a specific namespace: (make this as default type)

\$ kubectrl config set-context --current --namespace=<namespace-name>

# To list all namespaces:

\$ kubectrl get namespaces

# To get resources within a specific namespace:

\$ kubectrl get <resource-type> -n <namespace-name>

\$ kubectrl get deploy -n my-bank

\$ kubectrl get deploy --namespace my-bank

\$ kubectrl get all --namespace my-bank

# To delete a namespace and all associated resources:

\$ kubectl delete namespace <namespace-name>

\$ kubectl delete ns my-bank

kubectl create ns mydeploy

kubectl apply -f deploy.yml -n mydeploy

## Yml file

apiVersion: v1

kind: Namespace

metadata:

name: my-demo-ns

```
akshitha@ITP-CC16-19:~$ (sudo) password for akshitha:
akshitha@ITP-CC16-19:~$ kubectl create ns my-bank
namespace/my-bank created
akshitha@ITP-CC16-19:~$ kubectl config set-context --current --namespace=my-bank
Context "minikube" modified.
akshitha@ITP-CC16-19:~$ kubectl get <resource-type> -n <namespace-name>
-bash: syntax error near unexpected token `newline'
akshitha@ITP-CC16-19:~$ kubectl get all -n my-bank
No resources found in my-bank namespace.
akshitha@ITP-CC16-19:~$ kubectl get all -n my-bank
No resources found in my-bank namespace. No resources found in my-bank namespace.
akshitha@ITP-CC16-19:~$ kubectl get all -n my-bank
No resources found in my-bank namespace.
Not command not found
akshitha@ITP-CC16-19:~$ sudo nano deployment.yml
(sudo) password for akshitha:
akshitha@ITP-CC16-19:~$ kubectl apply -f deployment.yml
Deployment.apps/v1beta2 created
The Service "my-service" is invalid: spec.ports[0].nodePort: Invalid value: 30002: provided port is already allocated
akshitha@ITP-CC16-19:~$ sudo nano deployment.yml
akshitha@ITP-CC16-19:~$ kubectl apply -f deployment.yml
Deployment.apps/v1beta2 configured
service/my-service created
akshitha@ITP-CC16-19:~$ kubectl get service my-service -n my-bank
NAME      TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)          AGE
my-service NodePort    10.102.88.252 <none>         7070:30001/TCP   7s
akshitha@ITP-CC16-19:~$ sudo nano pod.yml
akshitha@ITP-CC16-19:~$ kubectl apply -f pod.yml
Error from server (NotFound): error when creating "pod.yml": namespaces "my-demo-ns" not found
akshitha@ITP-CC16-19:~$ kubectl create namespace my-demo-ns
namespace/my-demo-ns created
akshitha@ITP-CC16-19:~$ kubectl apply -f pod.yml
pod/my-pod created
akshitha@ITP-CC16-19:~$ kubectl get pods -n my-demo-ns
NAME      READY   STATUS    RESTARTS   AGE
my-pod    1/1     Running   0           31s
akshitha@ITP-CC16-19:~$ kubectl describe pod my-pod -n my-demo-ns
Name:
Namespace: my-demo-ns
Priority: 0
Service Account: default
Node: minikube/192.168.49.2
Start Time: Thu, 20 Mar 2025 11:30:12 +0000
Labels: <none>
Annotations: <none>
Status: Running
IP: 10.244.0.23
IPs:
  IP: 10.244.0.23
Containers:
  my-container:
    Container ID: docker://c4ebc20e8b8b31add23f6dbdee0081afb79fe1e6bcb2c3ceea32ffca1c89369
```

```
akshitha@ITP-CC16-19:~$ kubectl apply -f pod.yml
pod/my-pod created
akshitha@ITP-CC16-19:~$ kubectl get pods -n my-demo-ns
NAME      READY   STATUS    RESTARTS   AGE
my-pod    1/1     Running   0           31s
akshitha@ITP-CC16-19:~$ kubectl describe pod my-pod -n my-demo-ns
Name:      my-pod
Namespace: my-demo-ns
Priority:   0
Service Account: default
Node:      minikube/192.168.49.2
Start Time: Thu, 20 Mar 2025 11:30:12 +0000
Labels:    <none>
Annotations: <none>
Status:    Running
IP:        10.244.0.23
IPs:
  IP: 10.244.0.23
Containers:
  my-container:
    Container ID: docker://c4ebc20e8b8b31add23fd6bdee00081afb79fe1e6bbc2c3cea32ffca1c89369
    Image:      akshitha1910/simplewebapp:latest
    Image ID:   docker-pullable://akshitha1910/simplewebapp@sha256:9b9227b28504a732e5e45d8dc92748f65621fa8f1485f1b6ed0a563966e99a7c
    Port:      <none>
    Host Port: <none>
    State:     Running
      Started: Thu, 20 Mar 2025 11:39:15 +0000
    Ready:     True
    Restart Count: 0
    Environment: <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-9m7zl (ro)
Conditions:
  Type              Status
  PodReadyToStartContainers  True
  Initialized         True
  Ready               True
  ContainersReady     True
  PodScheduled        True
Volumes:
  kube-api-access-9m7zl:
    Type:      Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds: 3607
    ConfigMapName: kube-root-ca.crt
    ConfigMapOptional: <nil>
    DownwardAPI: true
  QoS Class:           BestEffort
  Node-Selectors:      <none>
  Tolerations:         node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
                      node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
Events:
  Type Reason Age From Message
  ----
  Normal Scheduled 35s default-scheduler Successfully assigned my-demo-ns/my-pod to minikube
  Normal Pulling 35s kubelet Pulling image "akshitha1910/simplewebapp:latest"
  Normal Pulled 32s kubelet Successfully pulled image "akshitha1910/simplewebapp:latest" in 2.379s (2.379s including waiting). Image size: 520040333 bytes.
  Normal Created 32s kubelet Created container my-container
  Normal Started 32s kubelet Started container my-container
akshitha@ITP-CC16-19:~$ kubectl logs my-pod -n my-demo-ns
NOTE: Picked up JDK_JAVA_OPTIONS:  --add-opens=java.base/java.lang=ALL-UNNAMED --add-opens=java.base/java.lang.invoke=ALL-UNNAMED --add-opens=java.base/java.lang.reflect=ALL-UNNAMED --add-opens=java
a.base/java.io=ALL-UNNAMED --add-opens=java.base/java.util=ALL-UNNAMED --add-opens=java.base/java.util.concurrent=ALL-UNNAMED --add-opens=java.rmi/sun.rmi.transport=ALL-UNNAMED
20-Mar-2025 11:39:15.981 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log Server version name: Apache Tomcat/9.0.102
20-Mar-2025 11:39:15.986 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log Server built: Mar 2 2025 19:33:14 UTC
20-Mar-2025 11:39:15.987 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log Server version number: 9.0.102.0
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20-Mar-2025 11:39:15.987 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log OS Version: 5.15.167.4-microsoft-standard-WSL2
20-Mar-2025 11:39:15.987 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log Architecture: amd64
20-Mar-2025 11:39:15.987 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log Java Home: /opt/java/openjdk
20-Mar-2025 11:39:15.987 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log JVM Version: 21.0.6+7-LTS
20-Mar-2025 11:39:15.987 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log JVM Vendor: Eclipse Adoptium
20-Mar-2025 11:39:15.987 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log CATALINA_BASE: /usr/local/tomcat
20-Mar-2025 11:39:15.988 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log CATALINA_HOME: /usr/local/tomcat
20-Mar-2025 11:39:16.002 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log Command line argument: --add-opens=java.base/java.lang=ALL-UNNAMED
20-Mar-2025 11:39:16.002 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log Command line argument: --add-opens=java.base/java.lang.invoke=ALL-UNNAMED
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20-Mar-2025 11:39:16.004 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log Command line argument: -Djava.util.logging.manager=org.apache.juli.ClassLoaderLogManager
20-Mar-2025 11:39:16.004 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log Command line argument: -Djdk.tls.ephemeralDHKeySize=2048
20-Mar-2025 11:39:16.004 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log Command line argument: -Djava.protocol.handler.pkgs=org.apache.catalina.webresources
20-Mar-2025 11:39:16.004 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log Command line argument: -Dsun.io.useCanonCaches=false
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20-Mar-2025 11:39:16.038 INFO [main] org.apache.catalina.core.AprLifecycleListener.lifecycleEvent APR/OpenSSL configuration: useAprConnector [false], useOpenSSL [true]
20-Mar-2025 11:39:16.043 INFO [main] org.apache.catalina.core.AprLifecycleListener.initializeSSL OpenSSL successfully initialized [OpenSSL 3.0.13 30 Jan 2024]
20-Mar-2025 11:39:16.548 INFO [main] org.apache.coyote.AbstractProtocol.init Initializing ProtocolHandler ["http-nio-8080"]
20-Mar-2025 11:39:16.674 INFO [main] org.apache.catalina.startup.Catalina.load Server initialization in [956] milliseconds
20-Mar-2025 11:39:16.767 INFO [main] org.apache.catalina.core.StandardService.startInternal Starting service [Catalina]
```

```
akshitha@ITP-CC16-19:~$ kubectl logs my-pod -n my-demo-ns
NOTE: Picked up JDK_JAVA_OPTIONS:  --add-opens=java.base/java.lang=ALL-UNNAMED --add-opens=java.base/java.lang.invoke=ALL-UNNAMED --add-opens=java.base/java.lang.reflect=ALL-UNNAMED --add-opens=java
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